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SCIENTIFIC BALLOONS ACHIEVE ANTARCTIC FLIGHT RECORD

NASA and the National Science Foundation have achieved a new milestone in conducting scientific observations from balloons, by launching and operating three long-duration flights within a single Antarctic summer.

“Having three long-duration balloon science missions flying simultaneously is a record-setting event. But of greater significance is the increase in science that can be accomplished with only a modest increase in cost to the program,” said David Gregory, assistant chief of NASA’s Balloon Program at Wallops Flight Facility in Virginia.

Unique atmospheric circulation over Antarctica during its summer months allows scientists to launch balloons from a site near McMurdo Station, the Foundation's logistics hub in Antarctica, and recover them from nearly the same spot weeks later. During that time, each balloon circles the continent one to three times. Scientists from the United States, Japan, South Korea, France and other countries are using the balloons to investigate the nature of ultra-high-energy cosmic rays and to search for antimatter.

The three payloads will ride the stratospheric winds in the polar vortex, a persistent low-pressure system above the Antarctic continent that will help keep balloons aloft for up to six weeks. This orbital pattern allows for long and continuous observations of a variety of phenomena from a single instrument at a fraction of the cost of launching a satellite into space.

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The payloads launched Dec. 19 - 26 from McMurdo are the University of Maryland's Cosmic Ray Energetics And Mass (CREAM) experiment, the Balloon borne Experiment with a Superconducting Spectrometer (BESS) developed by NASA's Goddard Space Flight Center, Greenbelt, MD and Japan's High Energy Accelerator Center, Tsukuba, Japan, and Louisiana State University's Advanced Thin Ionization Calorimeter (ATIC).

The CREAM investigation will search for characteristic changes in elemental composition and energy spectra of very high-energy cosmic rays that might be associated with a particle acceleration limit in supernovae. ATIC is focusing on cosmic rays electrons, which are of particular interest because they are subject to synchrotron energy loses, so structure in their spectrum may be linked to individual, nearby sources. BESS will provide definitive measurements of low-energy antiprotons in solar minimum conditions, with precise data that will constrain models for dark matter, in addition to placing limits on decay of primordial black holes and cosmological antimatter.

Once the balloon flights are completed, the payloads will be retrieved, brought back to McMurdo, and then returned to the United States, where they can be refurbished and launched again.

NSF and NASA conduct an annual scientific-balloon campaign during the Antarctic summer. NSF manages the U.S. Antarctic Program and provides logistic support for all U.S. scientific operations in Antarctica. The Foundation facilitated the launches and will recover the payloads. NASA communication satellites help scientists collect data from the balloon experiments.

Antarctic balloon flights can last much longer than flights in other places because of the polar vortex and because there is very little atmospheric or temperature change. Constant daylight in Antarctica means no day-to-night temperature fluctuations on the balloon, which helps it stay at a nearly constant altitude during the flight.

"We are extremely proud of our launch crew in Antarctica," said W. Vernon Jones, senior scientists for suborbital research at NASA Headquarters, Washington. "Continuous operations support for three balloons in the air at one time, using the finest balloon vehicle made for this kind of cutting-edge scientific research, led to this major achievement," he added.

"If all three of these missions achieve their flight goals, this Antarctic campaign will result in almost 90 days of near-space flight at an average altitude of 23 miles, with experiments averaging more than 4,300 pounds," Jones said.

"This annual scientific balloon expedition demonstrates the deep commitment and very fruitful collaboration between NASA and the NSF that enables a wide variety of forefront scientific research in Antarctica," said Karl Erb, director of the Office of Polar Programs.

“Just as NSF provided the infrastructure and logistics support that made this hat trick possible, NASA provides the satellite communications link that is the lifeblood of astrophysics research at our new research station at the South Pole. Our partnership benefits both agencies and more importantly, the U.S. science community,” he said.

“Demanding science and excellent atmospheric conditions over the Antarctica in the austral summer led our two agencies to sign an agreement in 2003 aimed at increasing the launch tempo from one or two to three balloons per season. With modest investments but considerable effort by both agencies, this goal is now achieved” he added.

Supporting the three science teams, the staff from NASA’s Columbia Scientific Balloon Facility, Palestine, Texas, traveled to Antarctica to launch the giant helium balloons.

“With the launch of the third balloon, we put 32,000 pounds of hardware, including 13,000 pounds of science instruments, into near space in a span of just over a week. It’s a magnificent accomplishment.” said Danny Ball, site manager for New Mexico State University the operator of the CSBF for NASA. “We’re extremely proud of our personnel who worked through Thanksgiving, Christmas, and New Years in harsh conditions in Antarctica to make this possible.”

To monitor the real time flight tracks of the three payloads on line, visit

http://www.csbf.nasa.gov/antarctica/ice0708.htm

For more information on NASA’s balloon operations, visit:

http://sites.wff.nasa.gov/code820/

For information on NSF sponsored scientific research in Antarctica, visit:

http://www.nsf.gov/div/index.jsp?div=ANT

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